Reducing NBA Injuries

Richard Hinds

Introduction

Richard Hinds

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Outline

Background

Data Understanding

Modeling

Results

Recommendations & Conclusions

Future Considerations

Background

Background

DeMarcus Cousins

4x NBA All-Star

2x All-NBA Second Team

NBA All-Rookie First Team

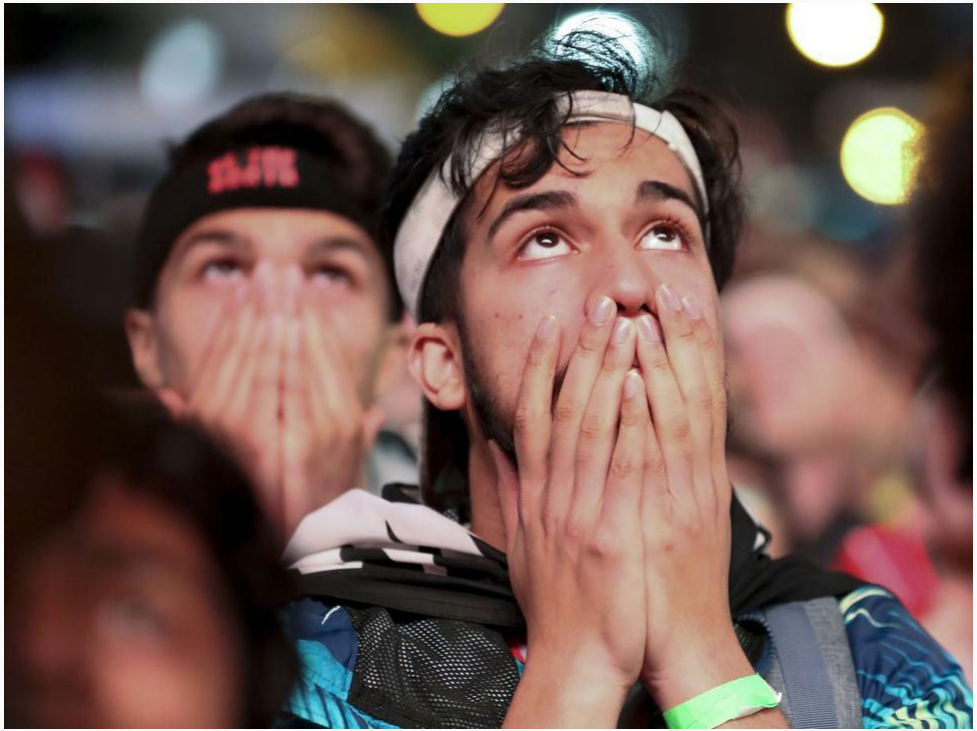
Background

POP!

Background

Season ending injuries

- Physically devastating
- Emotionally taxing
- Financially challenging



HOW CAN WE PREVENT INJURY AMONG NBA PLAYERS?

HOW CAN WE PREVENT INJURY AMONG NBA PLAYERS?

Identification is the first step in prevention

Data Understanding

Data Understanding

NBA Injury Dataset from Kaggle

- >9 seasons from 2010-2019
- 17,000 entries

NBA Player Statistics

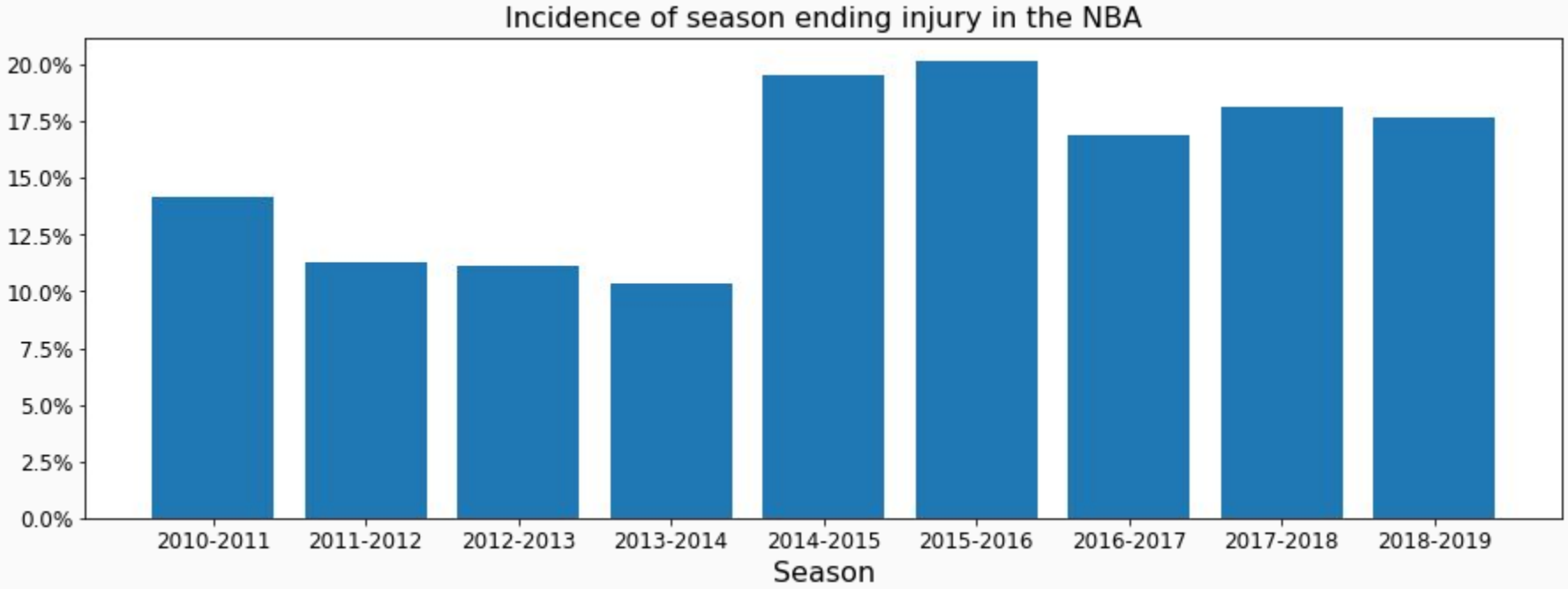
- Biographic
- Performance

kaggle

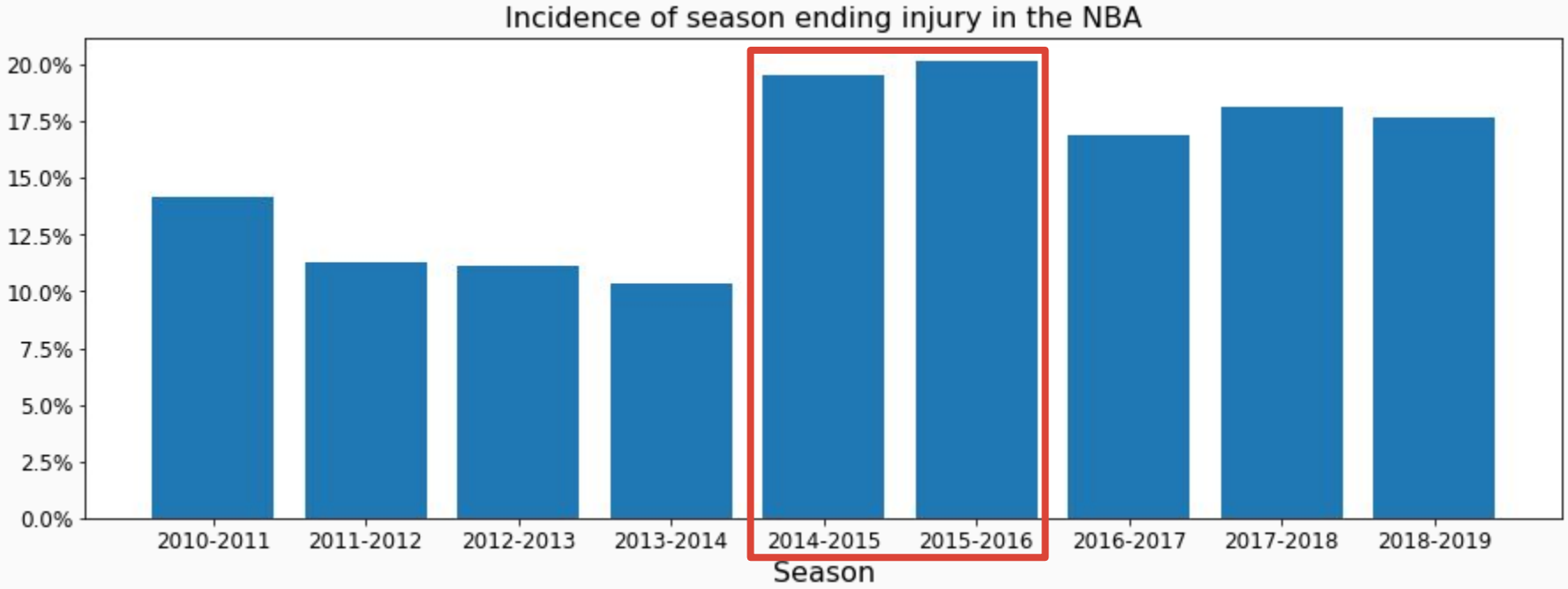
+

NBA

Data Understanding

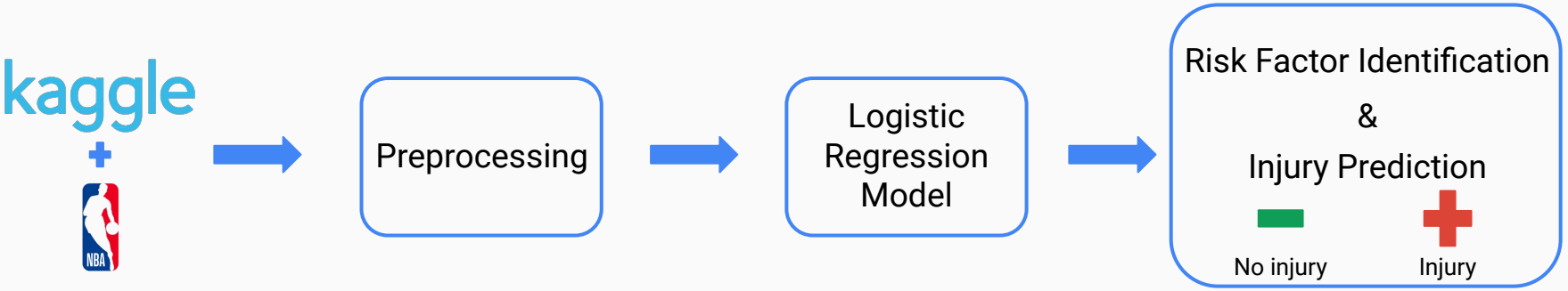


Data Understanding



Modeling

Modeling


kaggle
+
NBA
Preprocessing
Logistic Regression Model
Risk Factor Identification
&
Injury Prediction
No injury
Injury

Results

Results

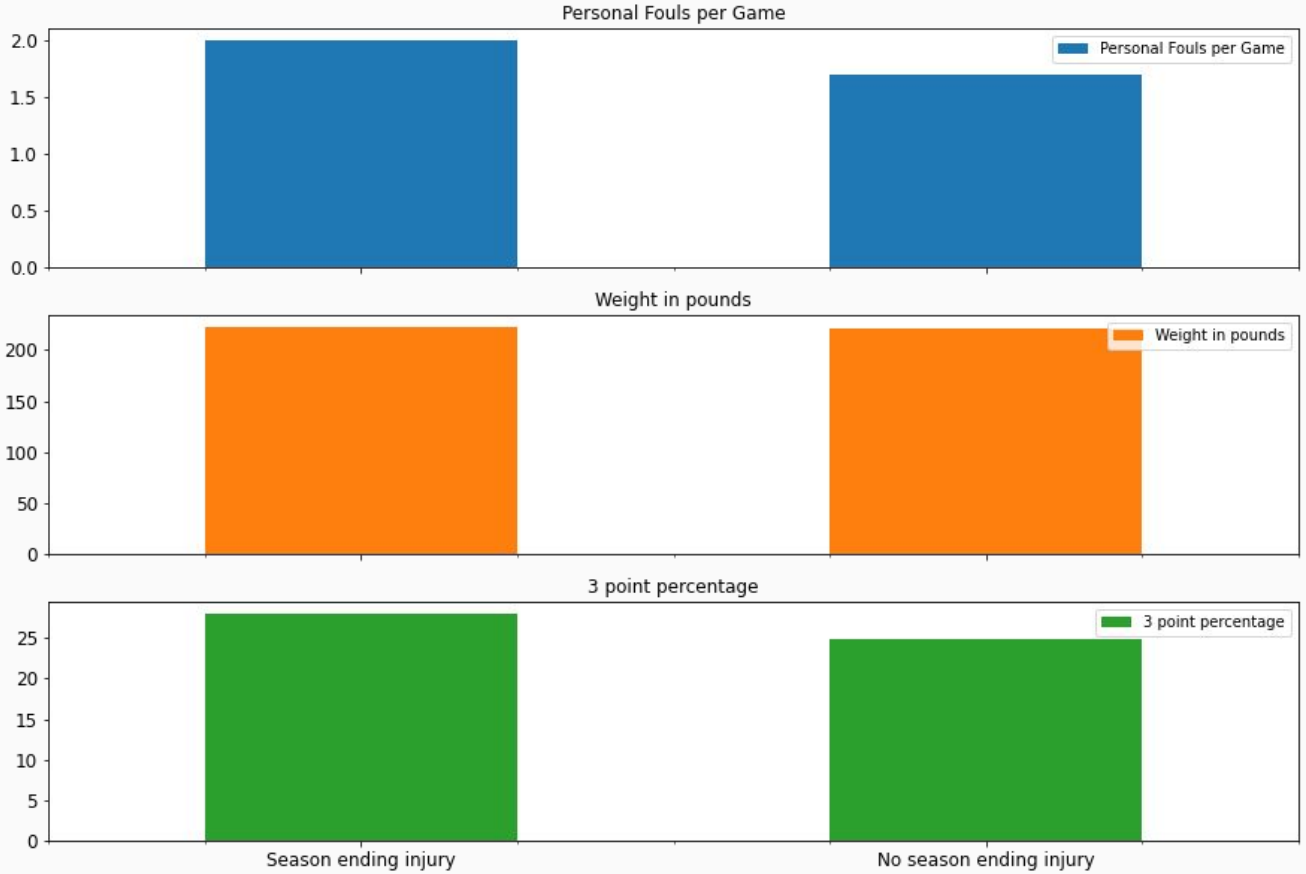
Logistic Regression: 67% Accuracy

1.57x risk of injury per personal foul

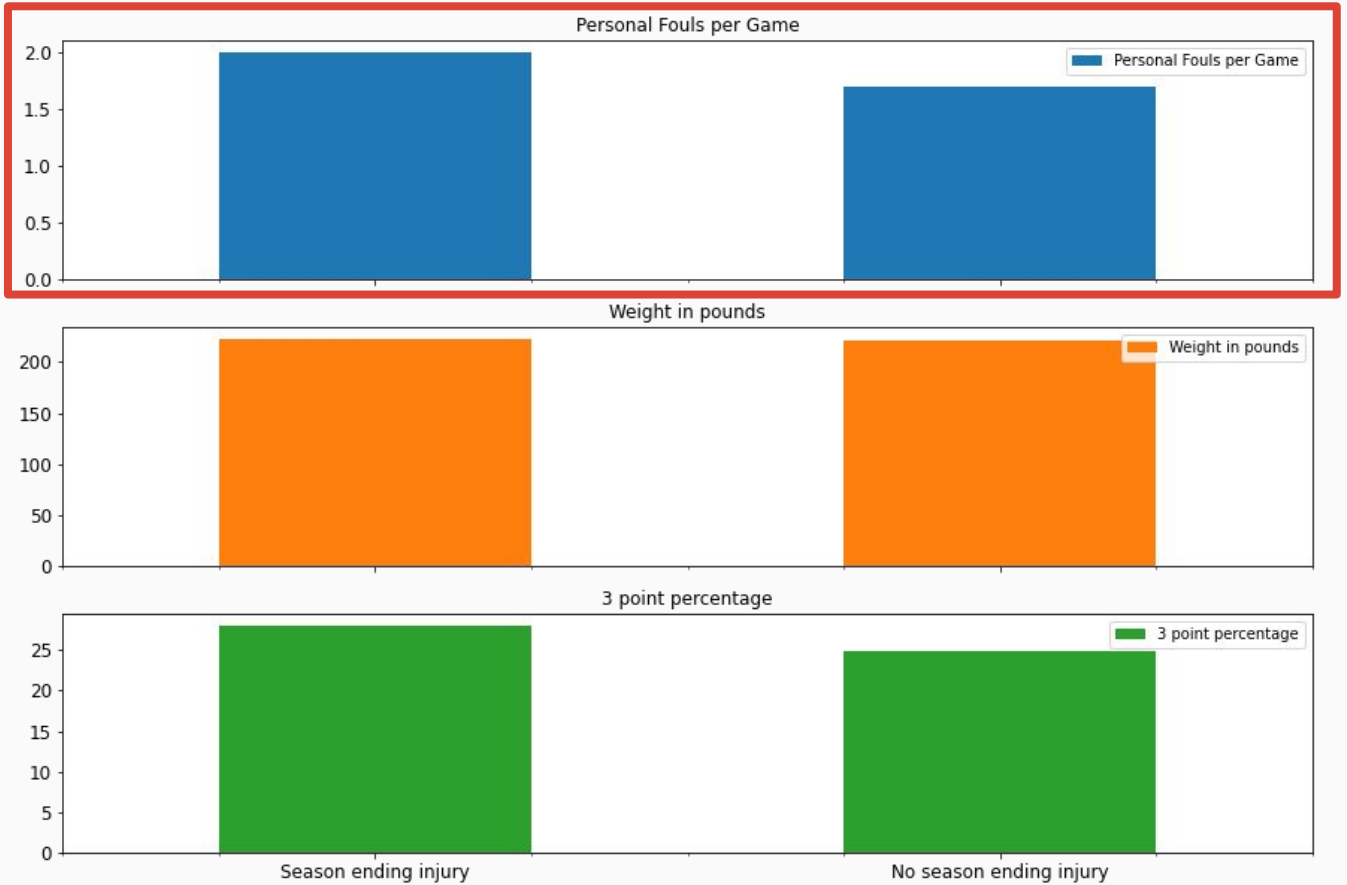
1.23x risk of injury per pound weighed

1.2x risk of injury per percent of 3 point accuracy

Results


Personal Fouls per Game
Personal Fouls per Game
2.0
1.5
1.0
0.5
0.0
Weight in pounds
Weight in pounds
200
150
100
50
0
3 point percentage
3 point percentage
25
20
15
10
5
0
Season ending injury
No season ending injury

Results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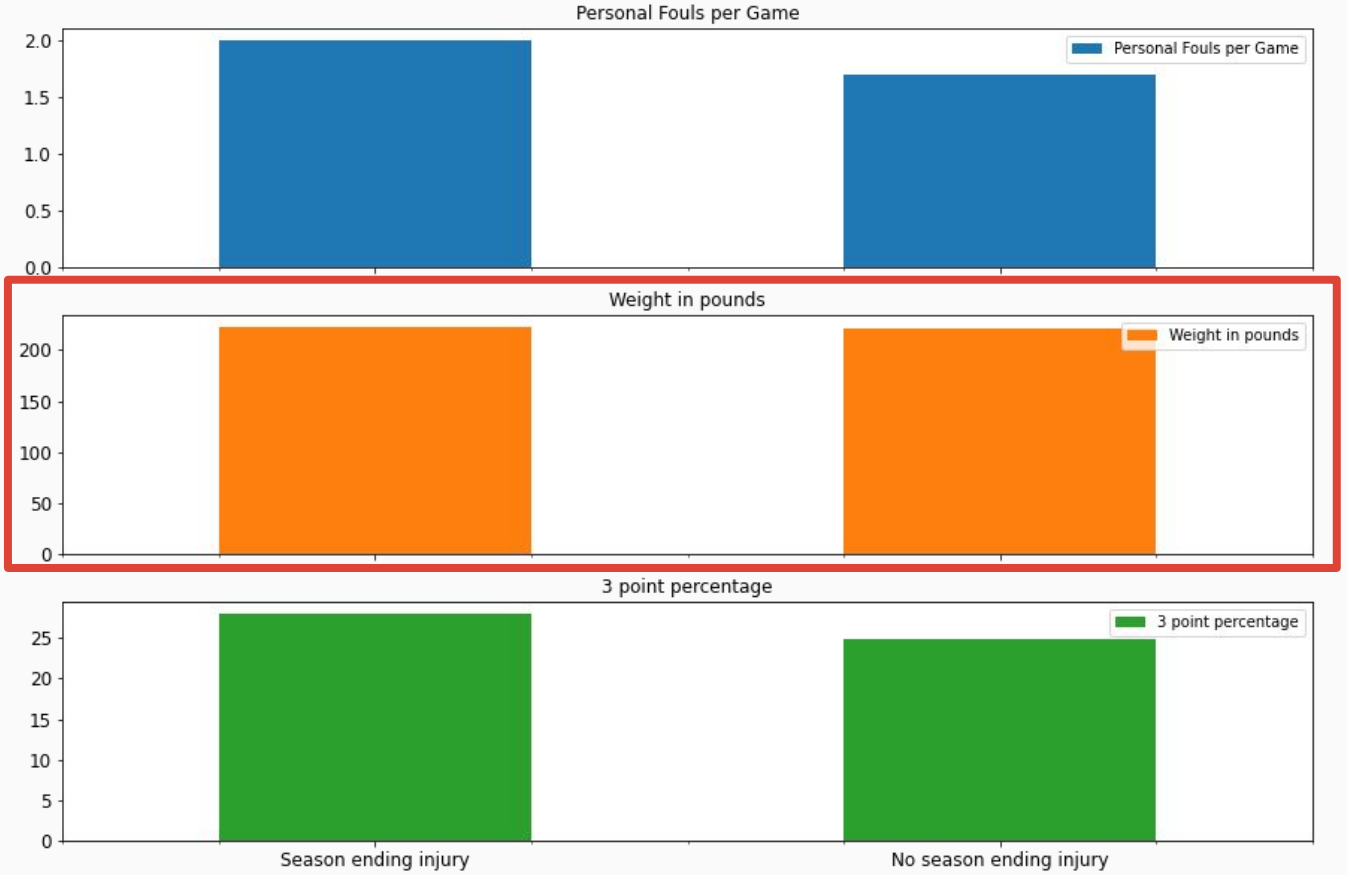
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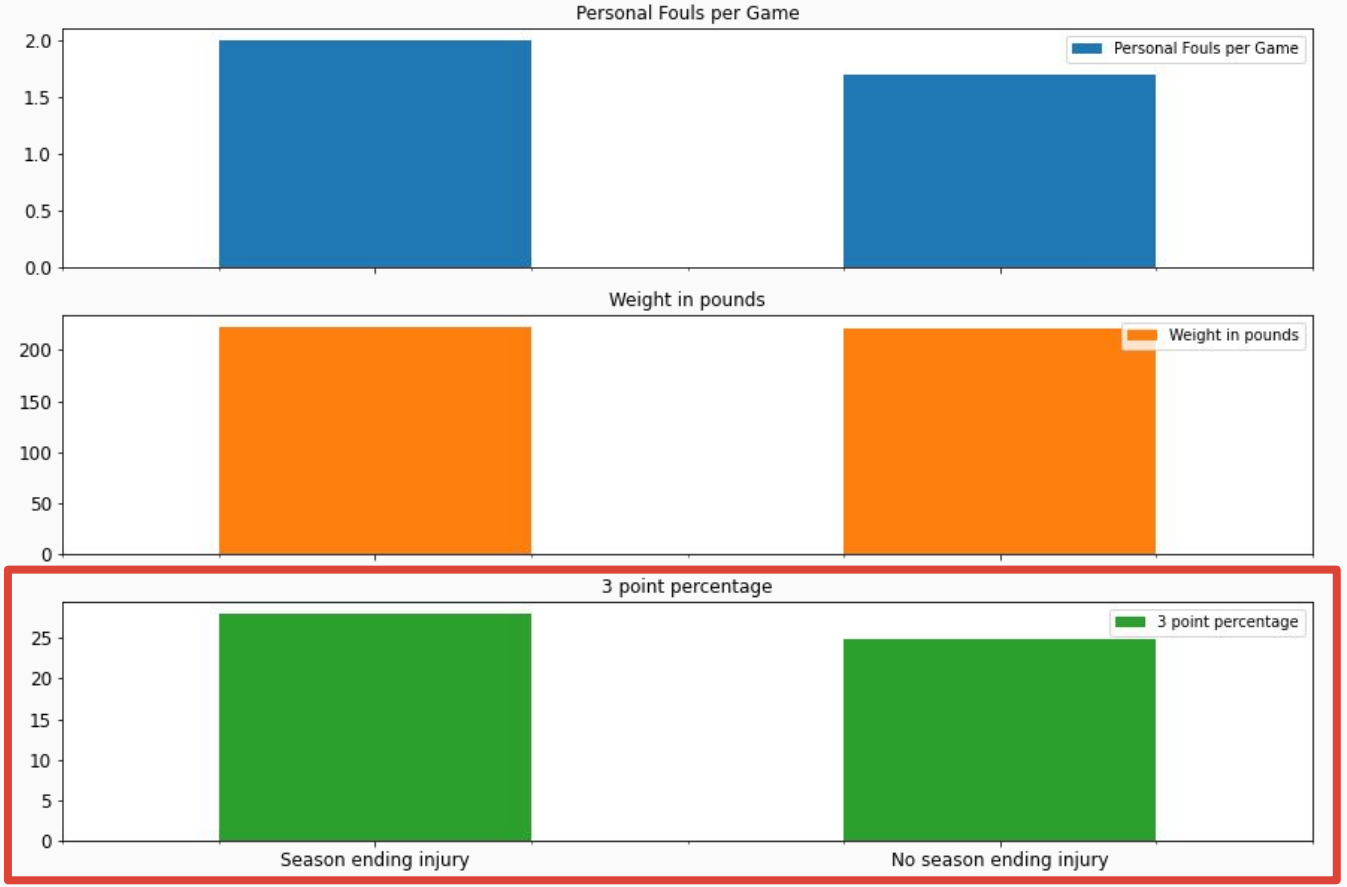
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Recommendations & Conclusions

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Foul avoidance

Monitor players > 223 pounds

Jumpshot landing training

Recommendations & Conclusions

At risk profile

> 2.0 fouls per game

> 223 pounds

> 28% 3 point accuracy

Cousins' 2016-2017 season

3.9 fouls per game

270 pounds

36.1% 3 point accuracy

Future Considerations

Future Considerations

Matched cohort risk analysis

Injury segmentation

Weekend warrior extrapolation

Thank You

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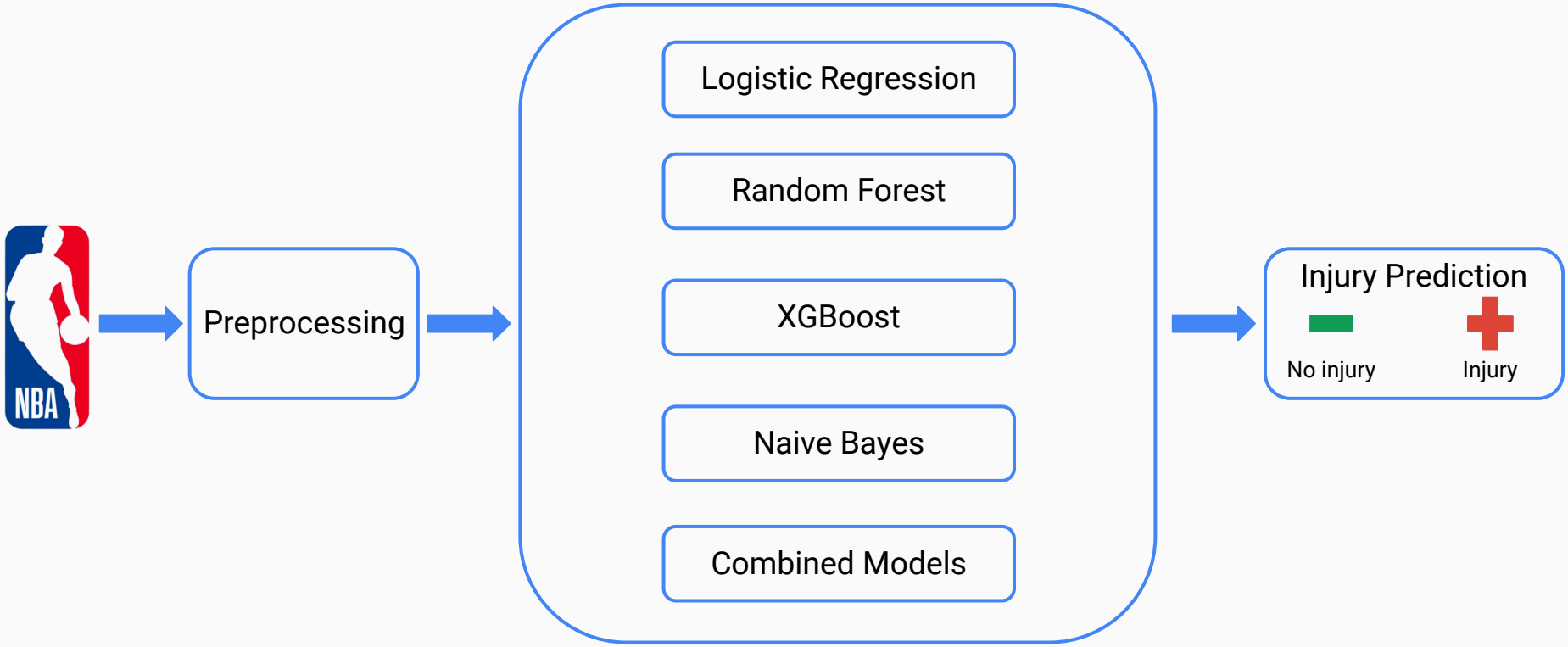
APPENDIX

Results

Model	Accuracy	AUC	f1_score
Random Forest	90%	96%	90%
XGBoost	90%	96%	90%
Combined Models	80%	88%	80%
Logistic Regression	67%	73%	66%

Modeling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Naive Bayes
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No injury
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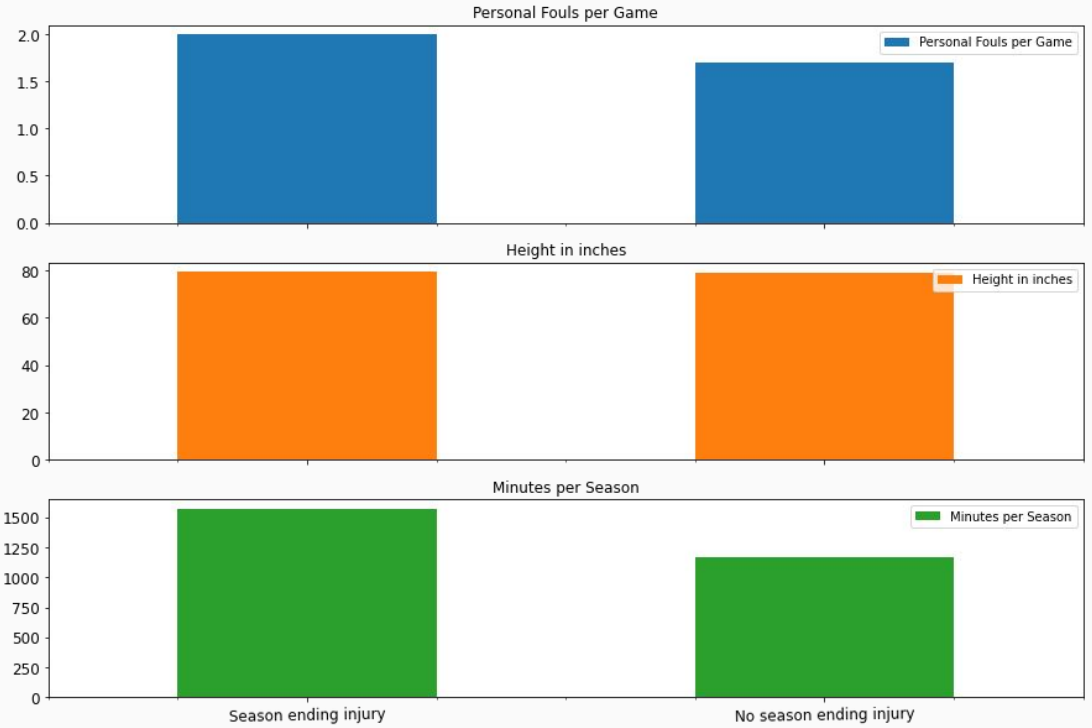
Conclusions & Recommendations

2.0 vs 1.7 fouls per game

79.4 vs 79.1 inches tall

1570 vs 1164 minutes per season



Recommendations & Conclusions

At risk profile

2.0 fouls per game

> 223 pounds

> 28% 3 point accuracy

Cousins' 2017-2018 season

3.8 fouls per game

270 pounds

35.4% 3 point accuracy

Conclusions & Recommendations

2017-2018 season

3.8 fouls per game

270 pounds

35.4% 3 point accuracy

2021-2022 season

2.9 fouls per game

270 pounds

30.3% 3 point accuracy